

REMARKS

Claims 1-4, 7-15, and 18-29 are all the claims pending in the application, claims 5, 6, 16 and 17 having been canceled in previous amendments, and claims 21-29 having been added by the present amendment.

The foregoing new claims have been presented for purposes of "unbundling" the Markush groups of claims 18 and 20, and have not been submitted in response to any rejection or objection relating to patentability. These new claims merely recite in isolation individual features that are included in their parent claims, and therefore have already been considered by the Examiner. As such, this amendment raises no new issues requiring further consideration or search. Accordingly entry of these claims is believed proper and is respectfully requested.

Claims 1-4, 7-15, and 18-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Sgroi (U.S. patent no. 5,357,048) in view of Gruenbaum (U.S. patent no. 5,565,641) and Smith et al. (U.S. patent no. 6,018,118). Applicant respectfully traverses these rejections, and requests reconsideration and allowance of the pending claims in view of the following arguments.

Substance of Interview

As a preliminary matter, Applicant and the undersigned gratefully acknowledges the courtesies extended by the Examiner in the March 30, 2004, telephone interview on this matter. Pursuant to M.P.E.P. § 713.04, Applicant provides the following remarks concerning this interview.

Applicant discussed claims 15, 18, and 20 in light of the teachings of the Sgroi patent. Concerning claims 15 and 18, Applicant submitted that Sgroi only provides teachings relating to operations on non-MIDI incoming control signals and therefore cannot teach or suggest the generation of outgoing digital control signals based upon a non-merging combination of first and

second incoming control signals of MIDI format. The Examiner maintained the position that claim 15 was not distinguishable over Sgroi. However, the Examiner indicated that claim 18 required a more detailed review of Sgroi.

With regard to claim 20, Applicant noted that several of the Markush group elements of this claim recite the changing of one type of incoming MIDI control signals into outgoing MIDI control signals that are of a different type of control signal than the incoming signal. The Examiner recognized the shortcomings of the cited references and, while recognizing that other Markush elements involved other types of operations, indicated that this claim appeared to be allowable over the cited references but a closer review of Sgroi and the various message conversion methods of claim 20 would be required. The Examiner also remarked verbally and in the Interview Summary that “multiplication is merely fast addition,” although it is noted that claims 18 and 20 provide for multiplication by arbitrary scale factors (which may be fractional or other non-integer-valued factors) – in such cases the scaling multiplication is not readily describable as “fast additions.”

Rejection of claims 1-4, 7-15, and 18-20
Under 35 U.S.C. §103(a)

To establish a *prima facie* case of obviousness, the Examiner bears the burden of demonstrating that (1) there is some suggestion or motivation to modify the reference or to combine reference teachings; (2) there is a reasonable expectation of success; and (3) the prior art reference (or references when combined) must teach or suggest all the claim limitations. See M.P.E.P. § 2142.01 (citing *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)).

Smith Does Not Teach a Controllable LFO

With regard to independent claims 1 and 2, the Examiner asserts that Sgroi teaches each of the claim limitations except for the use of a control signal generator that is either a low frequency oscillator (LFO) or a transient generator (Office Action, pg. 2). The Examiner relies upon Smith to remedy this deficiency of Sgroi, stating that Smith teaches a LFO as recited in these claims. Applicant respectfully disagrees.

Smith is directed to a signal mapping system that maps sensor signals into control signals that control the operation of a music synthesizer (Smith, Abstract). Applicant's review of the cited portions of this reference reveals that the Smith device has a number of sensors which, in combination with sensor signal reading circuitry 104, generate sensor signals (Smith col. 4, lines 11-19) which may be offset by the value of a time-varying LFO, if any, assigned to the note (Smith col. 5, lines 54-55). As shown in Fig. 1, system signal mapper 110 maps these sensor signals (six force-sensitive resistor signals in addition to drum and pedal signals), into control parameters for music synthesizer 112 (Smith col. 4, lines 52-55).

Applicant first assumes *arguendo* that, as asserted in the Office Action, signal mapper 110 teaches a LFO control signal generator. Under this assumption, Smith therefore provides, at best, teachings of a time-varying LFO control signal generator that produces values independently of the sensor signals (Smith, Figure 1). However, and more importantly, Smith contains absolutely no teachings relating to a LFO that is controlled by control signals. This is in contrast to the invention of claims 1 and 2 where one purpose is to create LFO or transient-generator signals (or both) that are explicitly responsive to incoming control signals. The whole purpose of Smith, instead, is to simply map sensor signals into control parameters for a musical synthesizer (Smith col. 4, lines 52-55), permitting an LFO value to be added in. Accordingly, Applicant submits that Smith does not

teach or suggest a control signal generator that operates in response to an “incoming control signal,” as recited in independent claims 1 and 2. As a result, even if the teachings of Sgroi and Smith were combined, the resulting system would not teach or suggest all of the claim limitations of claims 1 and 2.

Another distinguishing feature of claims 1 and 2 is that the LFO of Smith does not have the “associated control events and parameters” required by these claims. However, even if Smith did provide such a teaching, this reference lacks any teaching or suggestion for controlling such control events and parameters using an “incoming control signal.” This is, again, because the LFO of Smith does not operate in response to an “incoming control signal,” as described above. Applicant further notes that Gruenbaum, used only to provide an example of a MIDI input, does not remedy any of the deficiencies of Smith as Gruenbaum and provides no teaching of controlling an LFO or transient generator with an incoming control signal.

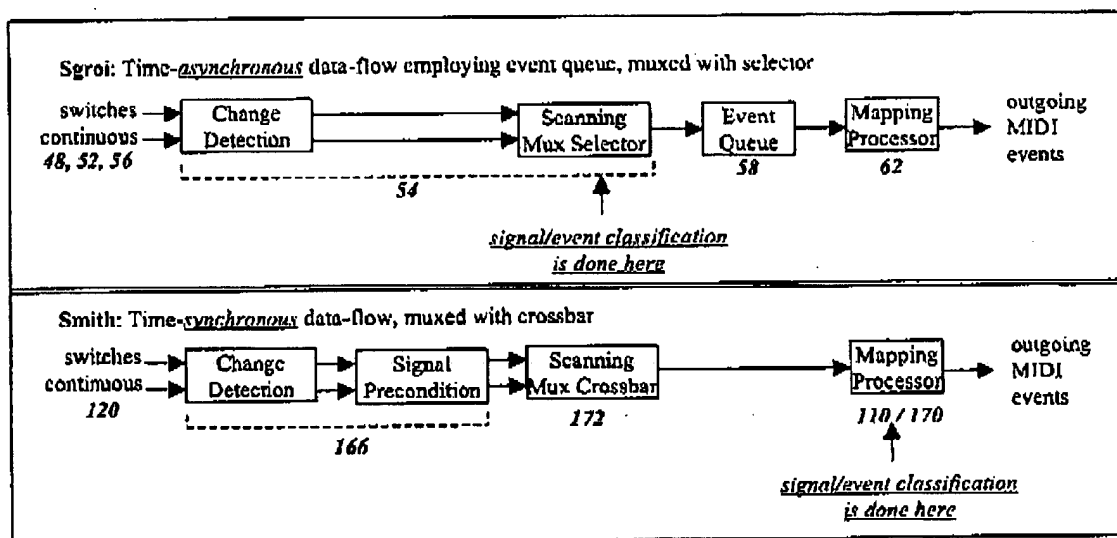
Because all the claim limitations of independent claims 1 and 2 are not taught or suggested by Sgroi, Smith, and Gruenbaum, Applicant submits that the Examiner has failed to make out a *prima facie* case for obviousness. Accordingly, these independent claims, and their respective dependencies, claims 3-4 and 7-14, are believed to be patentable.

No Suggestion To Combine the Teachings of Sgroi and Smith

Notwithstanding the above, Applicant further notes that it is well established that if the “proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.” See M.P.E.P. § 2143.01 (citing *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)). Furthermore, if the proposed modification or combination of the prior art would change the

principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. See M.P.E.P. § 2143.01 (citing *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)).

First of all, Applicant recognizes that there are some high-level similarities between the Sgroi and Smith systems. For instance, both systems: accept non-MIDI switch signals (including panel switches and keyboard keys) and non-MIDI continuous signals (including sensors and potentiometers); detect changes in such signals; multiplex these signals using a scanning procedure; apply a mapping within a processor; and produce outgoing MIDI signals using a mapping processor. Both systems are in contrast to the invention of claims 1 and 2 which recite a processor that utilizes incoming MIDI control signals to generate outgoing MIDI signals.



The above diagram depicts the contrasting architecture and signal flow through the Smith and Sgroi systems. Clearly, these systems function using entirely different operating modes-- the Sgroi system utilizes a time-asynchronous data flow, whereas the Smith system relies upon time-synchronous data flow.

Looking first at Sgroi, this system implements a conventional time-asynchronous architecture and as such must include an event queue 58 since the processor's ability to respond to a newly detected switch or continuous signal change depends upon the progress through the various extensive conditional paths and loops depicted in Figs. 5, 6, and 8A- 12. Further, the Sgroi scanning multiplexer 54 classifies events in the event queue before mapping occurs at processor 62. It is well known that a time-asynchronous system, such as Sgroi, requires some sort of event queue such as event queue 58.

In contrast, the Smith system is explicitly time-synchronous (Smith col. 7, lines 28-51) and relies on this time-synchronous architecture to accurately route as-yet unclassified signals through the scanning multiplexing crossbar 172 to permit a one-to-many mapping (Smith col. 8, lines 2-8 and 34-44; and col. 13, lines 34-54). In further contrast, signal/event classification (as a result of the one-to-many provision) occurs in the mapping processor 110/170.

In the Office Action, the Examiner asserts that it would have been obvious to one of ordinary skill in the art to replace the control signal generator of Sgroi with the LFO control signal generator of Smith (Office Action pg. 5). Applicant submits that the Sgroi and Smith systems implement signal flow timing architectures and signal/event classifications which are handled using entirely incompatible techniques. The Sgroi system and Smith systems are architecturally incompatible and therefore incapable of being combined.

Nevertheless, even if such a combination were possible, the resulting system would be one in which the time-asynchronous Sgroi system would generate MIDI output using the LFO of the time-synchronous Smith system. Even if such a system were functional, such a modification would require a fundamental change in the operational characteristics of the Sgroi system (from a "time-asynchronous" system to a "time-synchronous" system). Under these circumstances, M.P.E.P. §

2143.01 unambiguously supports a finding of a lack of suggestion or motivation to modify Sgroi with the teachings of Smith. Therefore, independent claims 1 and 2, and their respective dependencies, claims 3-4 and 7-14, are believed to be patentable for these additional reasons.

Turning now to independent claim 15, a method is recited where the first and second incoming control signals comprise MIDI messages. In the Office Action, the Examiner recognizes the shortcomings of Sgroi and acknowledges that this reference does not teach MIDI input (Office Action, pg. 5). However, the Examiner declares that Gruenbaum provides MIDI input, and that one of ordinary skill in the art would have utilized the teachings of Sgroi and Gruenbaum to arrive at the method recited in claim 15. The reasoning for such a combination, as presented on page 5 of the Office Action, is that the Sgroi system processes signals generated by a keyboard, and keyboards commonly provide MIDI.

Sgroi Does Not Process "MIDI" Control Signals

The method of independent claim 15 recites the processing of first and second incoming control signals, where these signals comprise MIDI messages. Simply put, claim 15 requires the processing of MIDI control signals.

Applicant assumes for the sake of argument that the teachings of Sgroi and Gruenbaum can be combined in the manner asserted in the Office Action. Such a system would be one in which the Sgroi scanner 54 receives MIDI control signals from keyboard 56 (Sgroi Figure 4). Even if such a system were possible, Sgroi provides absolutely no teachings relating to the processing of MIDI control signals generated by keyboard 56. That is, even if keyboard 56 could generate MIDI control signals, as the Examiner proposes, the various subsequent components comprising the Sgroi system are unable to process these MIDI signals. To do so

would further needlessly require the high overhead of assembly of MIDI messages in one component only to immediately disassemble it in a subsequent component, all to convey a simple numerical value which can readily be passed within and among co-executing loops or algorithms with no such needless overhead.

Applicant agrees that the Sgroi system provides some amount of signal processing, but such processing is limited to the manipulation of non-MIDI signal data. For example, as shown in Fig. 4, the Sgroi system includes the following components: scanner 54, event compiler 58, element memory 60, randomizer 64, and processor 62. None of these components, individually or collectively, process incoming MIDI control signals.

Looking in more detail at scanner 54, the specification states that the primary function of scanner 54 is to “generate Events” (Sgroi col. 4, lines 12-14). An “Event” is a change of input state from which “MIDI commands will be generated” (Sgroi col. 4, lines 19-21). This means that scanner 54 is a device that generates signals (Events) which will later be used to generate a MIDI signals. Absolutely no MIDI signal processing is taking place at scanner 54.

Additional components of the Sgroi system include: element compiler 58, which is a first-in-first-out (FIFO) buffer containing Event data (Sgroi col. 4, lines 17-18); element memory 60, which is a device used to store element data (Sgroi col. 4, lines 55-62); and randomizer 64, is a random number generator (Sgroi col. 7, lines 1-3). None of these components process nor handle MIDI control signals.

Lastly, processor 62 is a device that “implements a series of subroutines which converts Events into MIDI commands” (Sgroi col. 5, lines 1-2). As noted above, an “Event” is a change of input state from which “MIDI commands will be generated” (Sgroi col. 4, lines 19-21).

Processor 62 is simply a device that converts non-MIDI data into MIDI commands.

In sum, Sgroi does not provide any disclosure relating to the processing of incoming MIDI control signals, as recited in claim 15. Based on the foregoing, even if the teachings of Sgroi and Gruenbaum were combined, the resulting system would not teach or suggest all of the claim limitations of Applicant's claim 15. Accordingly, claim 15, as well as its dependent claims 18 and 19, are also believed to be patentable.

No Suggestion To Combine the Teachings of Sgroi and Gruenbaum

The Examiner has combined the teachings of Sgroi and Gruenbaum to arrive at the method recited in claim 15. In addition to the above argument, Applicant respectfully submits that such a combination is improper, and will demonstrate that the proposed modification of Sgroi would significantly change how the Sgroi system operates— at best with no value nor motivating purpose—and at worse the resultant system would be non-functioning. Applicant's position is again supported by M.P.E.P. § 2143.01 which dictates that if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.

As set out in detail above, the whole purpose of Sgroi is to process or otherwise manipulate non-MIDI signals generated by a keyboard to produce a MIDI output. The modification of Sgroi, as proposed by the Examiner, is one which would result in Sgroi processing MIDI control signals. Sgroi would therefore no longer operate as a MIDI controller that converts non-MIDI keyboard signals, but instead it would be a system that receives and processes MIDI control signals. Such a modification would require significant modification of most, if not all, of the components comprising the Sgroi system. That is, to arrive at the system

proposed by the Examiner, scanner 54, event compiler 58, element memory 60, randomizer 64, and processor 62 would all have to be significantly modified (in a manner not supported by its disclosure) in order to process MIDI control signals. This proposed modification of Sgroi is not only counter to how the system operates, but adds no value and is not motivated by the purpose of Sgroi device.

M.P.E.P. § 2143.01 compels a finding of a lack of suggestion or motivation to modify Sgroi with the teachings of Gruenbaum. Accordingly, claim 15 and its dependencies, claims 18 and 19, are patentable for these additional reasons as well.

Independent Claim 20

Applicant discussed claim 20 during the telephone interview with the Examiner. Applicant noted that claim 20 recites the changing of incoming MIDI control signals into outgoing MIDI control signals that are of a different type of MIDI control signal than the incoming MIDI control signal. The Examiner recognized the shortcomings of the cited references and indicated that this claim appeared to be allowable over these references, but a closer review of Sgroi and the various message conversion methods of claim 20 would be required.

New Claims 21-29

Newly added claims 21- 29 have not been formally rejected because they are being submitted in the present amendment. However, it is believed these claims are patentable at least by virtue of their dependence on the patentable independent claims.


CONCLUSION

The Examiner's rejections having been overcome, Applicant submits that the subject application is in condition for allowance. Should any issues remain unresolved, Examiner Fletcher is invited to telephone the undersigned attorney.

The Commissioner is hereby authorized to charge any fees that arise in connection with this filing which are not covered by the money enclosed, or credit any overpayment, to Deposit Account No. 02-0460.

Respectfully submitted,

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